I CLAIM:

1. A high capacity distributed packet switch comprising:

   a) a plurality of edge modules, each edge module including at least three input/output ports, the at least three input/output ports being organized in a group of J dual ports, a group of K dual ports and a group of L dual ports; wherein

   b) the group of J dual ports is connected by communication links to a single regional core center;

   c) the group of L dual ports is connected by communications links to a plurality of global core centers; and

   d) the group of K dual ports is connected by communications links to data traffic sources and data traffic sinks.

2. The high capacity distributed switch as claimed in claim 1 wherein said regional core center comprises a number of spatially distributed regional core modules.

3. The high capacity distributed switch as claimed in claim 1 wherein each of said plurality of global core centers comprises spatially distributed global core modules.

4. The high capacity distributed switch as claimed in claim 2 wherein each of said regional core modules comprises a plurality of parallel memory-less switches.

5. The high capacity distributed switch as claimed in claim 3 wherein each of said global core modules comprises a plurality of parallel memory-less switches.

6. The high capacity distributed switch as claimed in claim 4 wherein each of said plurality of parallel memory-less switches is an optical space switch.

7. The high capacity distributed switch as claimed in claim 5 wherein each of said plurality of parallel memory-less switches is an optical space switch.

8. The high capacity distributed switch as claimed in claim 1 wherein the plurality of edge modules are divided into groups, each group defining a region, and said group of J dual-ports of each edge module belonging to a one of the groups is connected exclusively to a respective regional core center.

9. The high capacity distributed switch as claimed in claim 1 wherein the L dual ports of said group of L dual ports of each edge module in a group of edge modules are connected directly to selected ones of the global core modules.

10. The high capacity distributed switch as claimed in claim 9 wherein the dual ports of said group of L dual ports of two or more of the edge modules in a group of edge modules are respectively connected to two or more of the global core modules via a memory-less shuffle stage.

11. The high capacity distributed switch as claimed in claim 9 wherein the dual ports of said group of L dual ports of two or more of the edge modules in a group of edge modules are respectively connected to two or more of the global core modules via a memory-less cross-connector.

12. The high capacity distributed switch as claimed in claim 2 wherein the regional core modules and their associated edge modules are spatially separated in a geographical zone bounded by a distance at which a propagation-delay of signals traveling on the links between any core module and any associated edge module is within a predetermined upper bound.

13. The high capacity distributed switch as claimed in claim 1 wherein a path between any two edge modules in a route passes through at most one adaptive channel-switching module.

14. The high capacity distributed switch as claimed in claim 2 wherein an edge module is collocated and associated with each regional core module, and a regional core controller is hosted by each of the edge modules collocated with the respective regional core modules.

15. The high capacity distributed switch as claimed in claim 3 wherein an edge module is collocated and associated with each global core module, and a global core controller is hosted by each of the edge modules collocated with the respective global core modules.

16. The high capacity distributed switch as claimed in claim 1 wherein each edge module maintains a routeset to every other edge module in the global distributed switch, the elements of each routeset identifying routes to a respective other edge module.

17. The high capacity distributed switch as claimed in claim 16 wherein the routes in each route-set are sorted according to a predetermined criterion.

18. The high capacity distributed switch as claimed in claim 2 wherein a regional core module is adaptively reconfigured in response to fluctuations in data traffic loads.

19. The high capacity distributed switch as claimed in claim 3 wherein a global core module is adaptively reconfigured in response to fluctuations in data traffic loads.

20. The high capacity distributed switch as claimed in claim 1 wherein a cyclic time period of a control timing circuit of a regional core module is substantially shorter than a cyclic time period of a control timing circuit of a global core module.

21. The high capacity distributed switch as claimed in claim 20 wherein the control timing circuit for each of the regional core modules comprises an 18-bit counter, the control timing circuit for each of the global core modules is a 22-bit counter, and a clock rate for each of the regional and global core modules is 16 megahertz.

22. The high capacity distributed switch as claimed in claim 1 wherein a rate at which a global core module is reconfigured is substantially lower than a rate at which a regional core module is reconfigured.

23. The high capacity distributed switch as claimed in claim 1 wherein the communications links in the group of L dual ports are optical links that support wavelength multiplexed data channels.

24. The high capacity distributed switch as claimed in claim 23 wherein the wavelength multiplexed data channels from the plurality of edge modules are shuffled together into a plurality of wavelength multiplexed links, each link carrying wavelengths from one or more of the edge modules.

25. The high capacity distributed switch as claimed in claim 23 wherein the wavelength multiplexed data channels from the plurality of edge modules are cross connected to a plurality of wavelength multiplexed links.

26. The high capacity distributed switch as claimed in claim 2 wherein the regional core modules include different numbers of parallel space switches.

27. The high capacity distributed switch as claimed in claim 2 wherein the global core modules include different numbers of parallel space switches.

28. The high capacity distributed switch as claimed in claim 2 wherein the regional core modules comprise one of optical space switches, electronic space

switches and a combination of optical space switches and electronic space switches.

29. The high capacity distributed switch as claimed in claim 2 wherein the global core modules comprise one of optical space switches, electronic spaces switches and a combination of optical space switches and electronic space switches.

30. The high capacity distributed switch as claimed in claim 2 wherein the regional core modules all comprise static cross-connectors.

31. The high capacity distributed switch as claimed in claim 3 wherein the global core modules all comprise static cross-connectors.

32. The high capacity distributed switch as claimed in claim 1 wherein the value of J is zero, and the edge modules interconnect solely with the global core modules.

33. The high capacity distributed switch as claimed in claim 11 wherein the memoryless cross-connectors are configured based on long term spatial traffic distribution estimations and projections.

34. The high capacity distributed switch as claimed in claim 33 wherein new route-sets are distributed to each edge module controller prior to reconfiguration of said memory-less cross connectors.